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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,192	09/09/2003	Taro Yajima	031112	1622

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EXAMINER

VERSTEEG, STEVEN H

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

1.2

Office Action Summary

Application No.

10/657,192

Applicant(s)

YAJIMA ET AL.

Examiner

Steven H. VerSteeg

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-12 and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The subject matter added to claims 1, 2, 5, 9, and 14 could not be located in the specification as originally filed and is considered to be new matter.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,252,354 B1 to Collins et al. (Collins).
5. For claim 1, Applicant requires a matching box connected to a plasma generator for changing at least one of a phase of current and a phase of voltage of RF power inputted from a RF source and outputting phase-changed RF power to the plasma generator, the matching box comprises a variable inductance elements that includes a main winding for determining

Art Unit: 1753

impedance of the variable induction element and a control winding magnetically coupled to the main winding wherein an impedance of the main winding is controlled based on a magnitude of direct current flowing through the control winding which is in turn based on plasma generation in the plasma generation.

6. For claim 2, Applicant require a matching box having a high voltage side output terminal connected to a plasma generator, an input terminal connected to an RF source, and a first variable inductance element that comprises a first main winding connected to the input terminal and high voltage side output terminal and a first control winding magnetically coupled to the first main winding; wherein an impedance of the first main winding is controlled based on a magnitude of direct current flowing through the first control winding which is in turn based on plasma generation in the plasma generation.

7. For claim 5, Applicant requires a matching box comprising a high voltage side output terminal connected to a plasma generator; an input terminal connected to an RF source; a ground side output terminal connected to ground voltage, and a variable inductance element that comprises a main winding connected to the ground side output terminal and a control winding magnetically coupled to the main winding wherein the main winding is controlled based on a magnitude of direct current flowing through the control winding which is in turn based on plasma generation in the plasma generator.

8. For claim 9, Applicant requires a vacuum apparatus comprising a vacuum chamber; an RF source; a matching box having a variable inductance element, and a plasma generator connected to the RF source via the matching box wherein the variable inductance element is connected between the RF source and the plasma generator wherein inductance of the variable

inductance element is controlled based on plasma generation in the plasma generator, and wherein a target object disposed in the vacuum chamber is subjected to vacuum processing.

9. Collins discloses an RF plasma source (abstract) comprising a matching box **150** that comprises a variable inductance element **230** that includes a main winding **232** and a control winding **236** that is magnetically coupled to the main winding through the magnetically permeable core **234**. The impedance of the main winding is controlled based upon a magnitude of the current flowing through the control winding and the DC power through the control winding is also controlled (col. 2, l. 7-46). The main winding is connected to the RF power supply **140** through input **150a** and is connected to the output to the high voltage output terminal (Figure 1A).

10. For claims 3 and 6, Applicant requires a first control power source that supplies power to the control winding. There is a current source **238** that supplies power to the control winding.

11. For claims 4 and 7, Applicant requires a first control circuit that produces a signal that changes a magnitude of the current sent to the control winding. A control circuit **200** is present.

12. For claim 8, Applicant requires the matching box to comprise a high voltage side output terminal connected to a plasma generator; an input terminal connected to an RF source; a ground side output terminal connected to ground voltage; and a second variable inductance element that comprises a second main winding connected to the input terminal and the ground side output terminal; and a second control winding magnetically coupled to the second main winding wherein the second main winding is controlled based on a magnitude of direct current flowing through the second control winding. Figure 1 shows that there is also a second variable inductance element **185** that comprises a second main winding and second control winding.

Art Unit: 1753

13. For claim 10, Applicant requires the variable inductance element to comprise a main winding and a control winding magnetically coupled to the main winding wherein a magnitude of the direct current flowing through the control winding controls the impedance of the main winding. As noted above, the plasma apparatus has the main winding **232** and the control winding **236**.

Claim Objections

14. Claims 5-7, 10, and 12 are objected to because of the following informalities: “generation” should be “generator” in the last line of claim 5. In claim 10, “control” should be “control” in line 5 of the claim (it was correct in the originally filed claim 10). Claims 6 and 7 depend from claim 5 and contain all of the limitations of claim 5. Therefore, claims 6 and 7 are objected to for the same reasons as claim 5. Claim 12 depends from claim 10 and contains all of the limitations of claim 10. Therefore, claim 12 is objected to for the same reasons as claim 10. Appropriate correction is required.

Response to Amendment

15. The objection to the drawings presented in the office action mailed April 27, 2005 is withdrawn in light of the amendment.

16. The objection to the specification presented in the office action mailed April 27, 2005 is withdrawn in light of the amendment.

17. The claim objections presented in the office action mailed April 27, 2005 are withdrawn in light of the amendment, but new objections are presented above necessitated by the amendment.

Art Unit: 1753

18. The 112-second paragraph rejections of claims 3 and 4 presented in the office action mailed April 27, 2005 is withdrawn in light of the amendment.

19. The 102(b) rejection of claims 1-10 over Collins presented in the office action mailed April 27, 2005 stands.

Allowable Subject Matter

20. Claim 13 is allowed.

21. The indicated allowability of claims 11 and 12 is withdrawn in view of the 112-first paragraph rejection presented above necessitated by the amendment.

Response to Arguments

22. Applicant's arguments filed August 19, 2005 have been fully considered but they are not persuasive.

23. Applicant has argued that the matching box claimed is different from that in Collins. Specifically, Applicant argues that the instant invention is "connected in series". There is no claim to being connected in series in the claims. Therefore, the argument is not germane.

24. Applicant then argues that the instant invention includes a control circuit that specifically measures the current flowing through the coil. Again, there is no such limitation in the claims and thus, the argument is not germane.

25. Applicant then argues that upon detection of the disappearance of the plasma, the variable inductance element is increased. Again, there is no such limitation in the claims and thus, the argument is not germane.

26. Finally, Applicant argues that the features presented in Collins do not function in the same manner as the instant invention. Applicant is arguing intended use. The claims are apparatus claims. The intended use does not provide patentable weight.

General Information

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Denis Boyd at (571) 272-0992.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.

Conclusion

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 1753

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Steven H VerSteeg
Primary Examiner
Art Unit 1753

shv
September 7, 2005